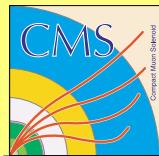


S. Lehti (HIP), S. Ilyin (MSU), A. Nikitenko (HIP)

## Study of the light Higgs in $qq \rightarrow qqH$ , $H \rightarrow \tau\tau$ ( $e/\mu + \tau$ jet, $e + \mu$ )

- estimates at low luminosity
- high luminosity aspects
  - triggering
  - false jets from pile-up
  - mass resolution degradation
  - soft (~20 GeV) jet reconstruction

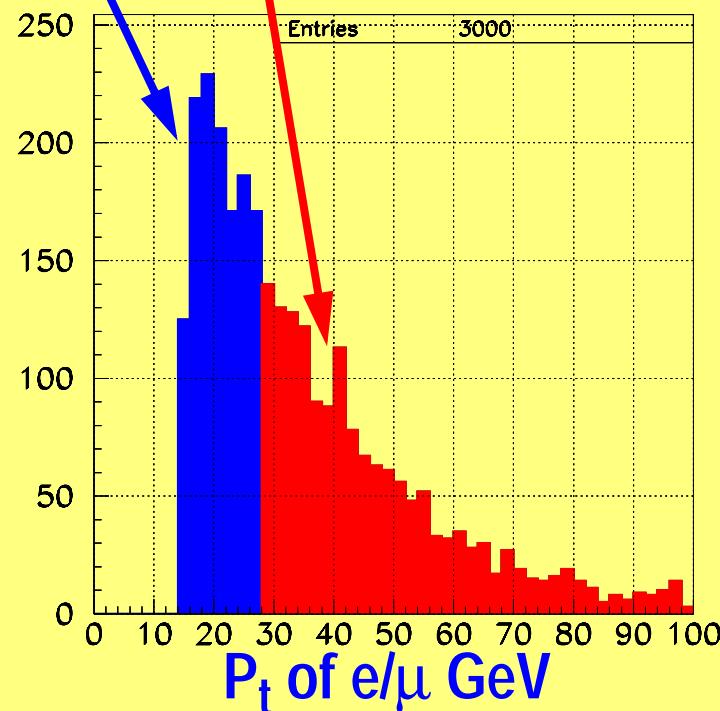


How to trigger on  $\text{qq} \rightarrow \text{qqH}$ ,  $\text{H} \rightarrow \tau\tau \rightarrow e + \tau$ -jet at L1 ?  
off-line cuts :  $E_t^{e/\mu} > 15 \text{ GeV}$ ,  $E_t^{\tau\text{jet}} > 30 \text{ GeV}$ ,  $E_t^{\text{tag jets}} > 30 \text{ GeV}$

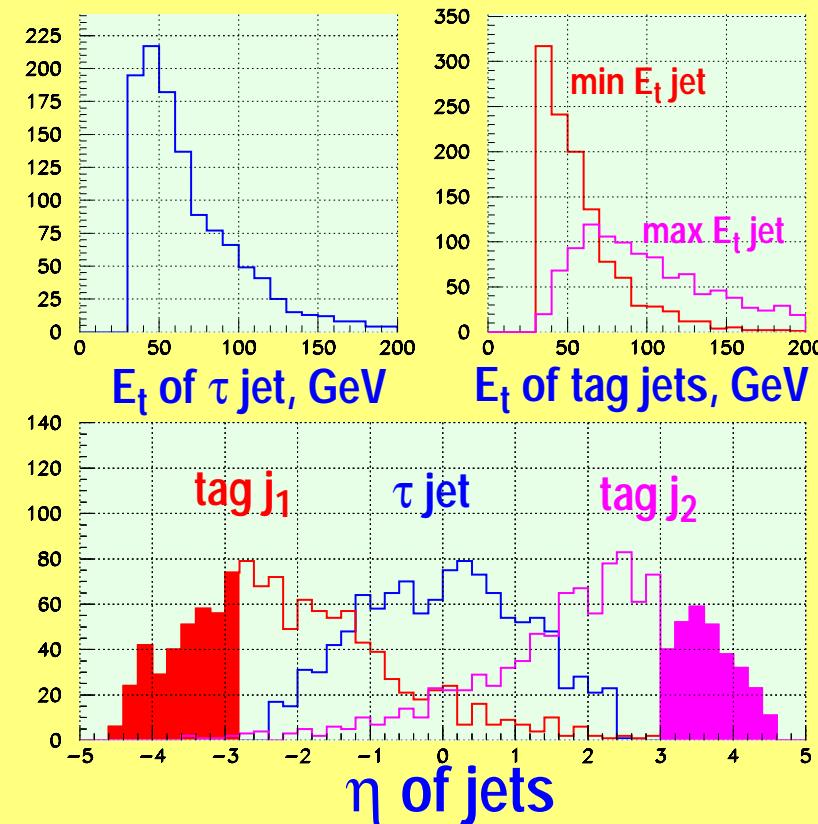
Lepton + 3 jets : kinematics for  $M_H = 135 \text{ GeV}$

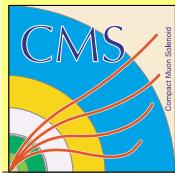
~ 45 % low  $E_t^e$  events for L1 e+2(3) jet ?

~ 55 % events for L1 e  $E_t > 25 \text{ GeV}$



$\tau$ -jet + tag jets kinematics



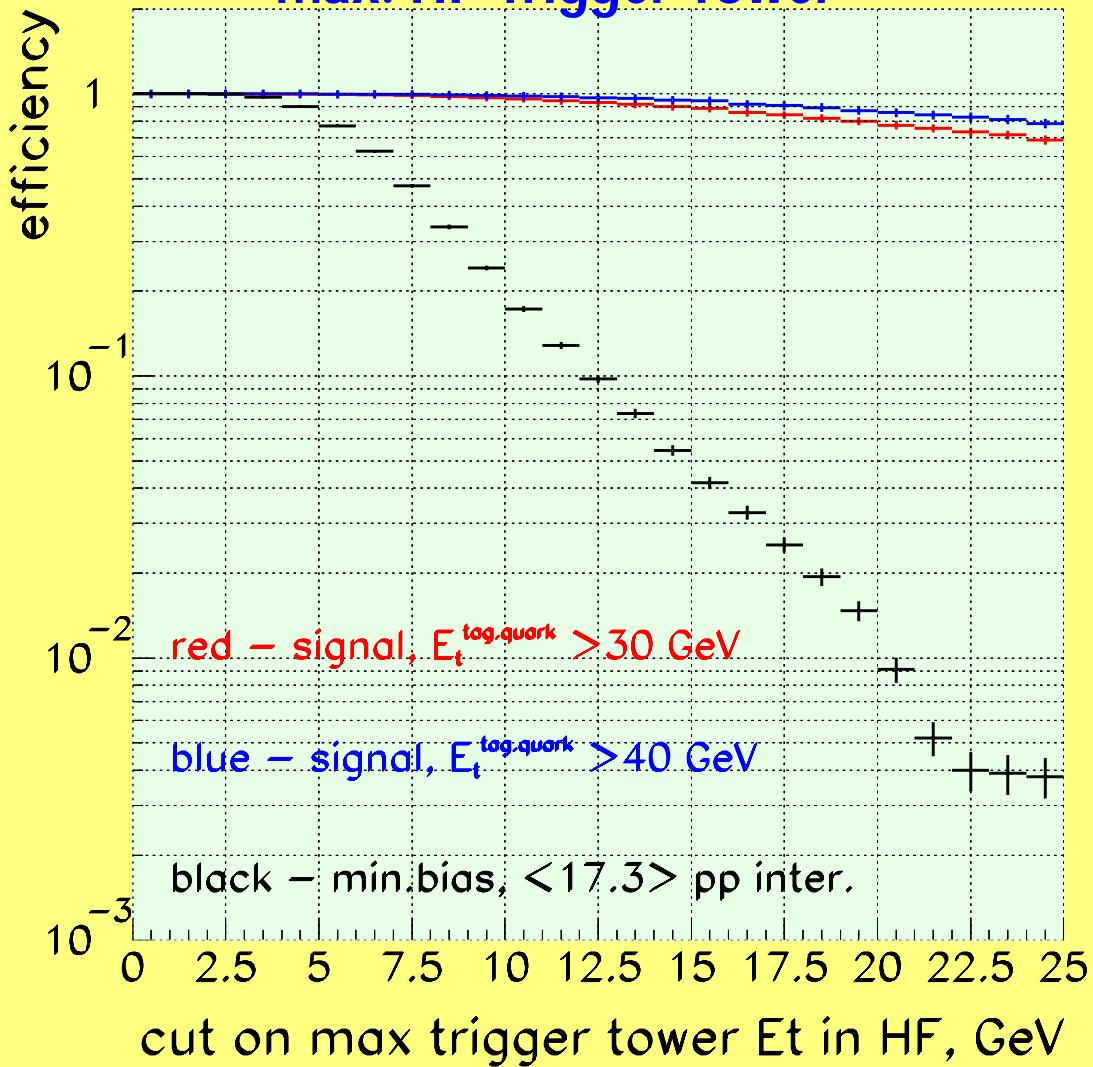


## Recognition of tagging jets from $q\bar{q} \rightarrow q\bar{q}H$ , $M_H = 135$ GeV in HF with HF Trigger Tower

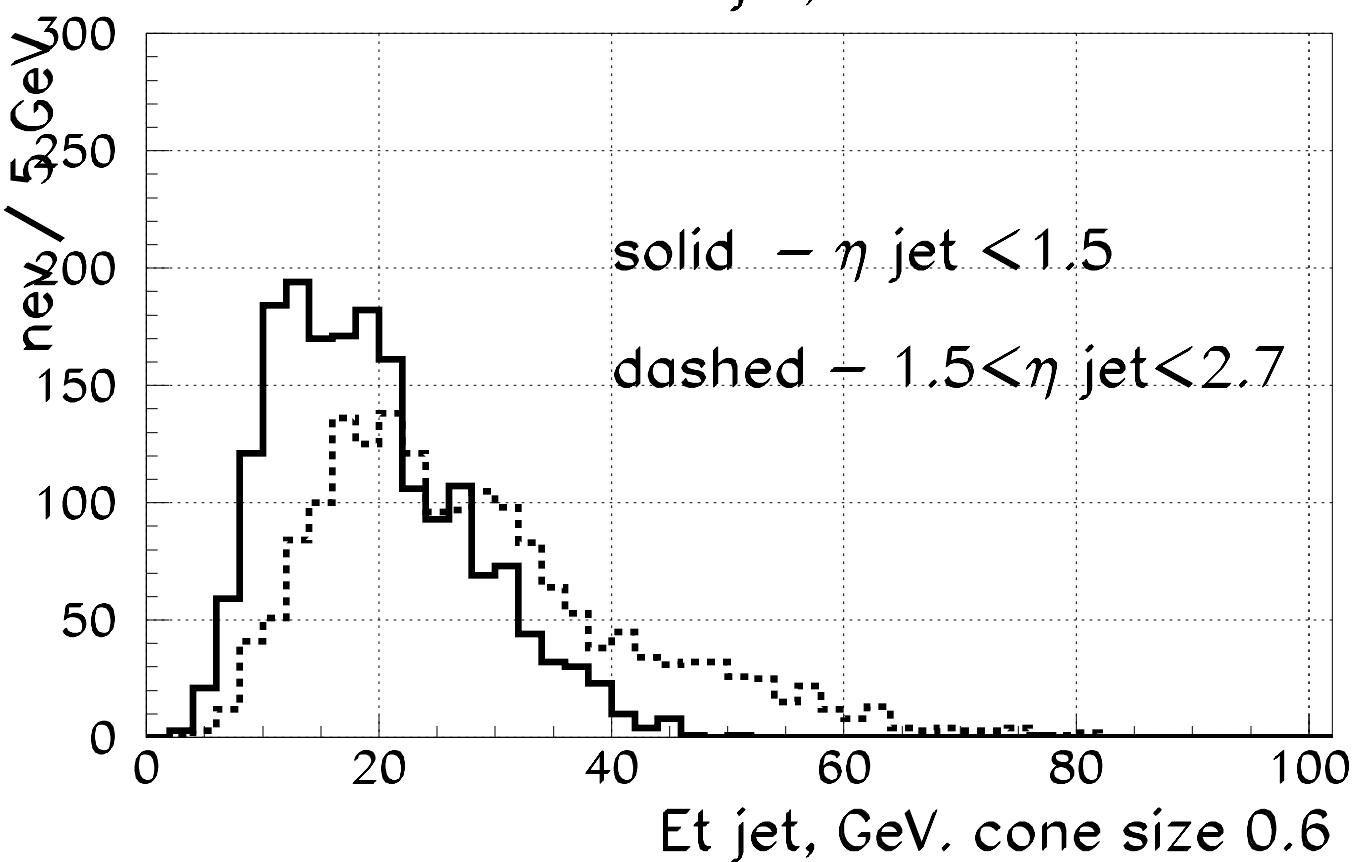
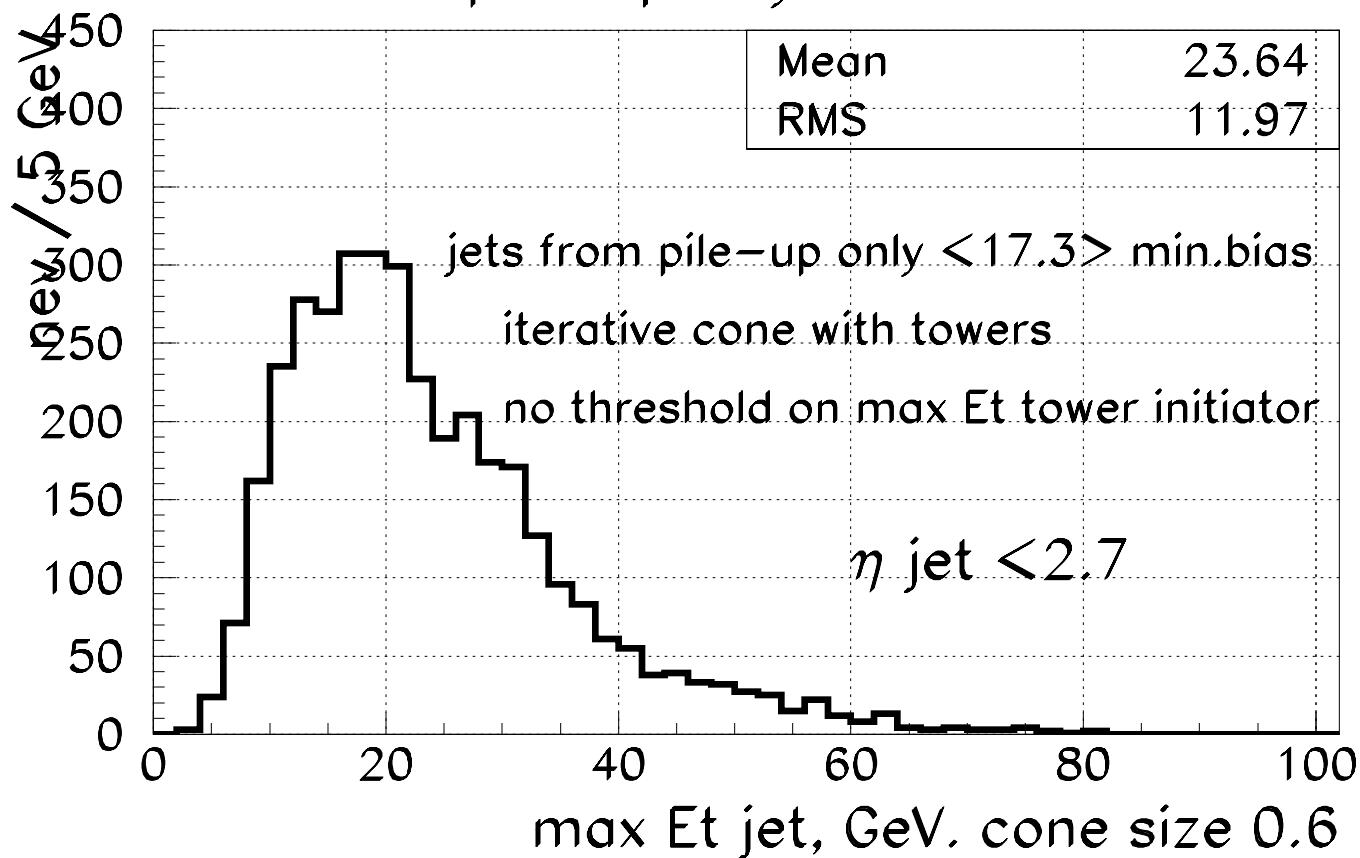
Trigger tower is taken as:

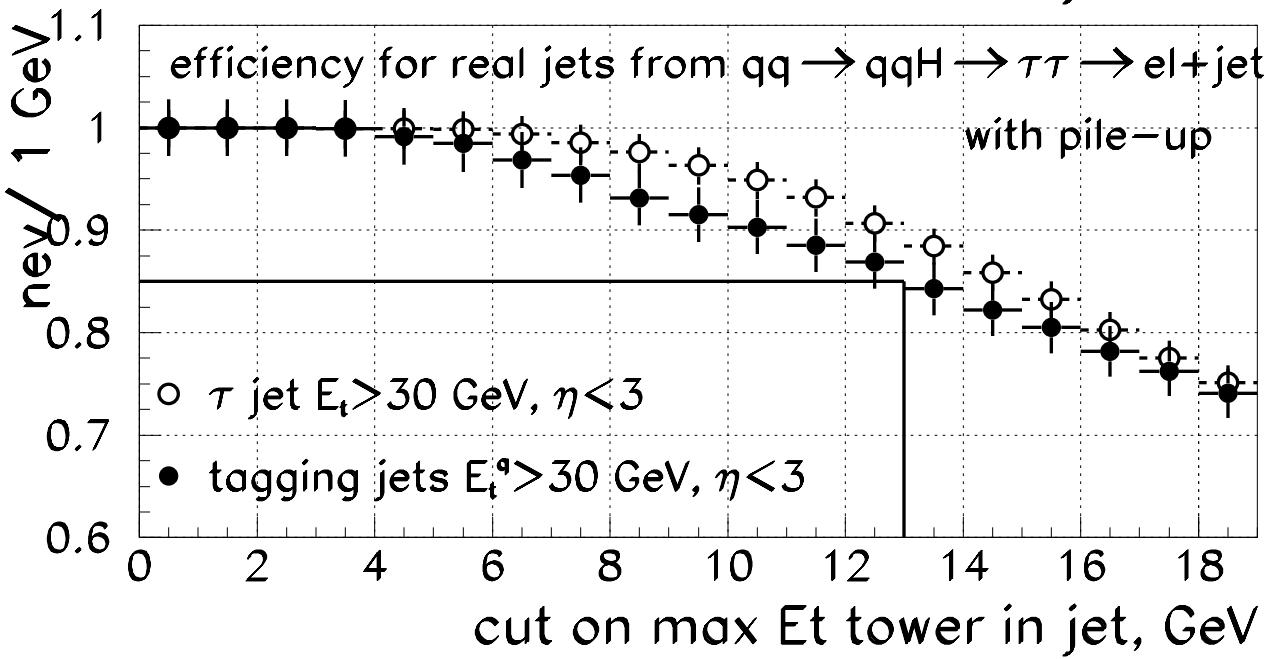
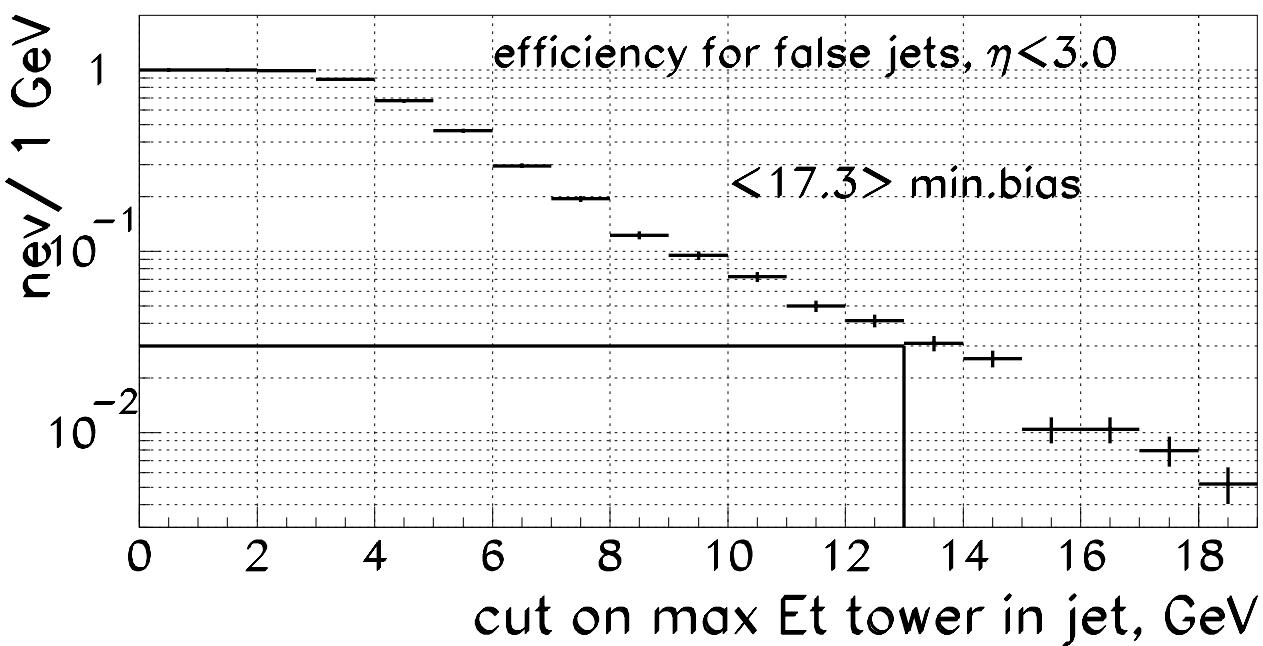
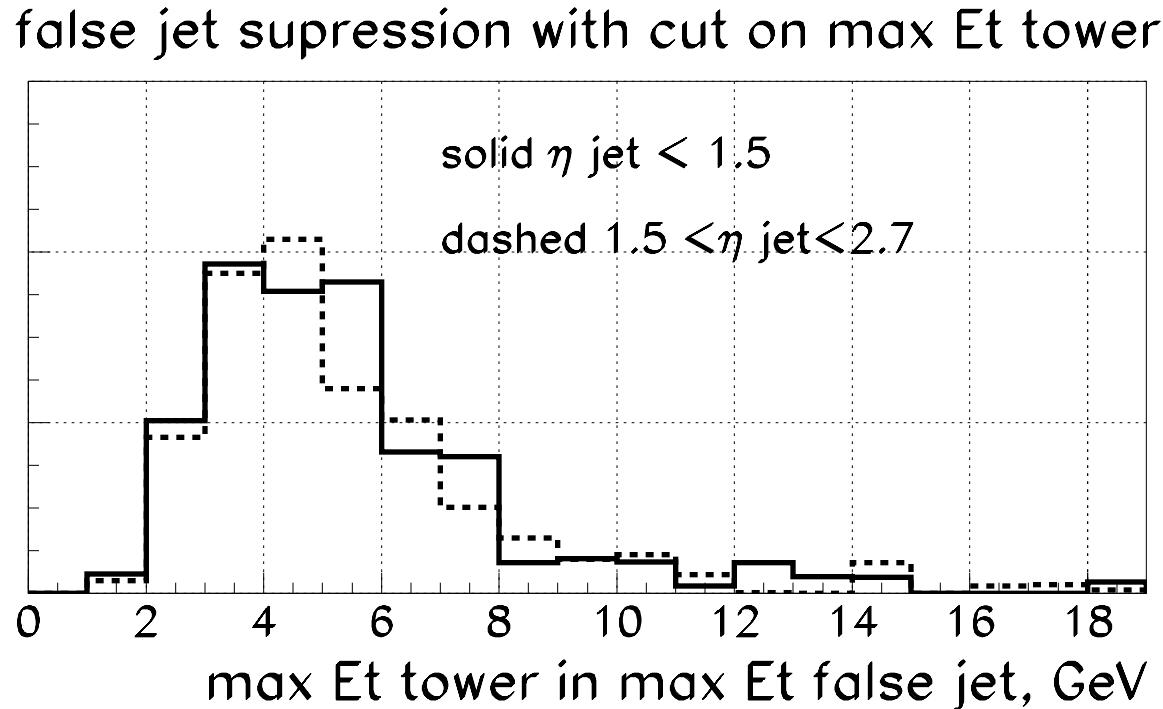
$$\eta \times \varphi = 0.35 \times 0.35 \quad (2 \times 2 \text{ HF towers})$$

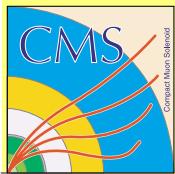
selection of tagging jets with cut on  
max. HF Trigger Tower



# Jets from pile-up only. $\langle 17.3 \rangle$ min.bias



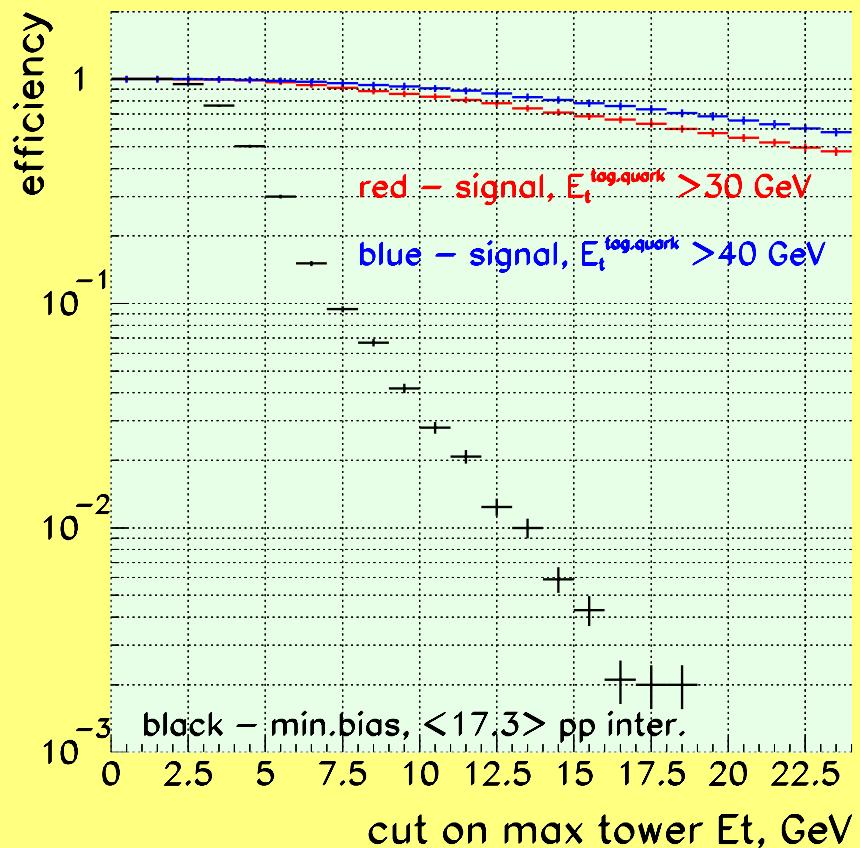
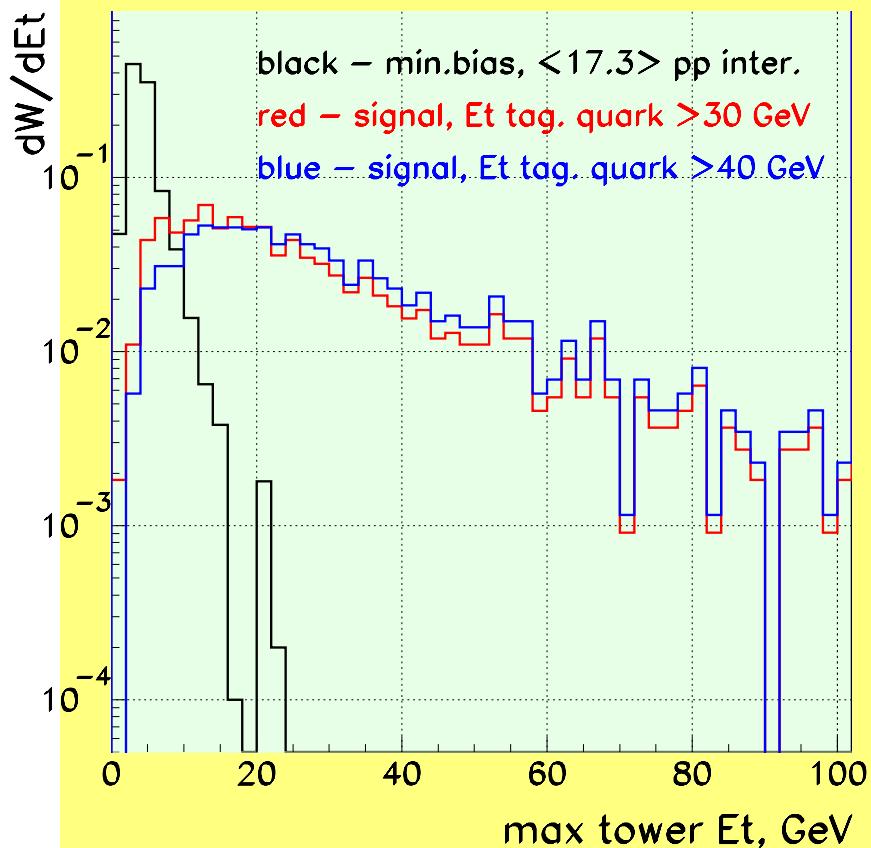


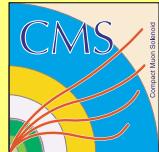


# Pattern recognition of tagging Jets from qq->qqH, M<sub>H</sub>=135GeV

cross-check of previous studies (CMS Note 1998/015, CMS TN/95-099) with  
ORCA HLT data

## Selection of tagging jets using cut on max. HF tower E<sub>t</sub>





## Higgs mass reconstruction for $qq \rightarrow qqH, H \rightarrow \tau\tau \rightarrow e + \text{jet}, M_H = 135 \text{ GeV}$

ORCA analysis. <17.3> min.bias superimposed

- $\text{missE}_t$  and  $\tau$ -jet reconstructed with ecal+hcal towers
- iterative cone algo with cone size 0.6 (for  $0.4 \sigma / M = 32/125$ )
- cut on digi 100 MeV for hcal and ebry and 150 MeV for efrj
- no jet energy corrections. hcal calibration with pions

